No.



9900266

THE UNITED STRATES OF AMERICA

TO ALL TO WHOM THESE: PRESENTS SHALL COME;

NASH Research Joundation

There has been presented to the

Secretary of Agriculture

AN APPLICATION REQUESTING A CERTIFICATE OF PROTECTION FOR AN ALLEGED DISTINCT VARIETY OF SEXUALLY REPRODUCED, OR TUBER PROPAGATED, PLANT, THE NAME AND DESCRIPTION OF WHICH ARE CONTAINED IN THE APPLICATION AND EXHIBITS, A COPY OF WHICH IS HEREUNTO ANNEXED AND MADE A PART HEREOF, AND THE VARIOUS REQUIREMENTS OF LAW IN SUCH CASES MADE AND PROVIDED HAVE BEEN COMPLIED WITH, AND THE TITLE THERETO IS, FROM THE RECORDS OF THE PLANT VARIETY PROTECTION OFFICE, IN THE APPLICANT(S) INDICATED IN THE SAID COPY, AND WHEREAS, UPON DUE EXAMINATION MADE, THE SAID APPLICANT(S) IS (ARE) ADJUDGED TO BE ENTITLED TO A CERTIFICATE OF PLANT VARIETY PROTECTION UNDER THE LAW.

NOW, THEREFORE, THIS CERTIFICATE OF PLANT VARIETY PROTECTION IS TO GRANT UNTO THE SAID APPLICANT(S) NOW, THEREFORE, THIS CERTIFICATE OF PLANT VARIETY PROTECTION IS TO GRANT UNTO THE SAID APPLICANT(S) AND THE SUCCESSORS, HEIRS OR ASSIGNS OF THE SAID APPLICANT(S) FOR THE TERM OF TWENTY YEARS FROM THE DATE OF THIS GRANT, SUBJECT TO THE PAYMENT OF THE REQUIRED FEES AND PERIODIC REPLENISHMENT OF VIABLE BASIC SEED OF THE VARIETY IN A PUBLIC REPOSITORY AS PROVIDED BY LAW, THE RIGHT TO EXCLUDE OTHERS FROM SELLING THE VARIETY, OR OFFERING IT FOR SALE, OR REPRODUCING IT, OR IMPORTING IT, OR EXPORTING IT, OR CONDITIONING IT FOR PROPAGATION, OR STOCKING IT FOR ANY OF THE ABOVE PURPOSE, OR USING IT IN ODUCING A HYBRID OR DIFFERENT VARIETY THEREFROM, TO THE EXTENT PROVIDED BY THE PLANT VARIETY TECTION ACT. IN THE UNITED STATES SEED OF THIS VARIETY (I) SHALL BE SOLD BY VARIETY NAME ONLY AS A F CERTIFIED SEED AND (2) SHALL CONFORM TO THE NUMBER OF GENERATIONS SPECIFIED BY THE OWNER OF THE SEED OF THIS VARIETY (I) SHALL BE SOLD BY VARIETY NAME ONLY AS A F CERTIFIED SEED AND (2) SHALL CONFORM TO THE NUMBER OF GENERATIONS SPECIFIED BY THE OWNER OF THE SECONDARY O

WHEAT. DURUM

'Mountrail'

In Testimonn Thereof, I have hereunto set my hand and caused the seal of the Hunt Anciety Frotection Prince to be affixed at the City of Washington, D.C. this thirty-first day of January, in the year of our Lord two thousand.

An marie Thro

Commissioner Plant Variety Protection Office Agricultural Marketing Service

Jan Hallinen

rotary of Agriculture

The state of the parties at a passic terms	ber propagated plant variety, and believe(s) that the variety is new, distinct, uniform, and stable as required in Section 42, niety Protection Act,
SIGNATURE OF OWNER Dale Zetocho	SIGNATURE OF OWNER
NAME (Please print or type)	NAME (Please print or type)

CAPACITY OR TITLE

Executive :8.7-470 (6-98) designed by the Plant Variety Protection Office with WordPerfect 6.0a. Repla

Director

CAPACITY OR TITLE

(See reverse for instructions and information collection burden statement)

DATE

'Mountrail'

Fall 1987

Original cross was made at North Dakota State University (NDSU) greenhouse. Pedigree - D8479/Renville

D8479 - D7984/D7926//D7982/D79155

D7984 - D6973/Ward//D74110

D6973 - D65150/D65151

D65150 - Pi/Tomclair//2*Tehuacan/3/ Zenati Bouteille/Wells

D65151 - Stewart//ld 379/ld 357/3/Dw F₄/Langdon/4/Leeds

D74110 - Edmore/Ward

D7926 - D7456/Vic

D7456 - D6771/Rugby

D6771 - Stewart 63//ld 393/Stewart

D7982 - D6973/Ward//D74110

D6973 - D65150/D65151

D65150 - Pi/Tomclair//2*Tehuacan/3/ Zenati Bouteille/Wells

D65151 - Stewart//ld 379/ld 357/3/Dw F₄/Langdon/4/Leeds

D74110 - Edmore/Ward

D79155 - D7224/Calvin

D7224 - D6530/D6654

D6530 - 561/Cappelli

561 - ld 3574//Sentry/192179-ld 357

D6654 - D61130/Leeds

D61130 - Lakota//Dw F₄/Langdon

Spring 1988 F₁ plants, NDSU greenhouse.

Summer 1988 F, plants, NDSU research land.

Summer 1989 F₃ head rows, NDSU research land.

Fall 1989 F₄ head rows, NDSU greenhouse.

Summer 1990	F_5 head rows, NDSU research land.
Summer 1991	F_6 preliminary yield trail, two locations, NDSU research land. Experimental line designation - D901313.
Summer 1992	\mathbf{F}_7 Advanced yield trial, two locations, NDSU research land.
Summer 1993	\mathbf{F}_8 Elite yield trial, three locations, NDSU research land.
Summer 1994	F, Uniform Regional Durum Nursery, 13 locations, North Dakota, South Dakota, Minnesota, Montana, and Canada.
Summer 1995	${f F}_{10}$ Uniform Regional Durum Nursery, 13 locations, North Dakota, South Dakota, Minnesota, Montana, and Canada.
Summer 1996	F_{11} Uniform Regional Durum Nursery, 13 locations, North Dakota, South Dakota, Minnesota, Montana, and Canada.
Summer 1996	Seed increase by Seedstocks Project.
Summer 1997	Uniform Regional Durum Nursery, 13 locations, North Dakota, South Dakota, Minnesota, Montana, and Canada.
Summer 1997	Second seed increase by Seedstocks Project.
Summer 1998	Uniform Regional Durum Nursery, 13 locations, North Dakota, South Dakota, Minnesota, Montana, and Canada.
Summer 1998	Third seed increase by Seedstocks Project.
November 5, 1998	D901313 was released as a named cultivar, Mountrail.

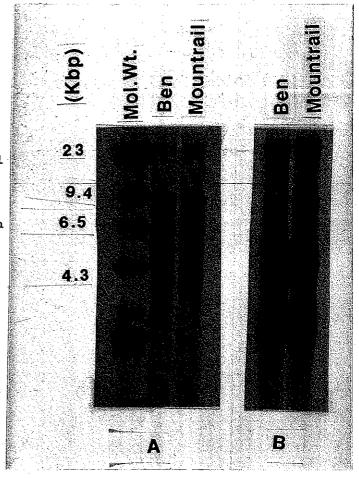
Mountrail was observed for nine generations from 1990 to 1998 and was shown to be stable and uniform. Mountrail has been rogued at the F_5 and subsequent generations. The frequency of rogued plants in each generation was less than 1/1000 plants. No variants were found in the variety Mountrail.

The pedigree breeding method was used to develop Mountrail. In early generations F_2 . F_4 high heritable traits such as plant height, maturity, and disease resistance were selected. Starting at F_5 generation, selection criteria also included grain yield, test weight, kernel weight, and pasta quality traits (i.e., protein content, gluten strength, milling extraction, spaghetti color, cooking quality, etc.). Based on data from multiple locations and years Mountrail was selected for its high yield and protein content, large kernel size, and gluten strength.

EXHIBIT B - NOVELTY STATEMENT

To my knowledge, Mountrail most nearly resembles Ben durum wheat. Ben and Mountrail durum wheat can be unambiguously differentiated by molecular markers. Restriction fragment length polymorphism (RFLP) analysis using clones WG583 and ABG473 detected polymorphisms between Ben and Mountrail.

RFLP analysis of genomic Figure 1. DNA showing restriction fragment size polymorphism between Ben and Mountrail. Panel A Autoradiogram of Ben and Mountrail Hind III-digested DNA hybridized with clone ABG473. Polymorphism is shown by the presence of 7.2, 5.9, and 4.6 kilobasepairs DNA fragments present in Ben and 6.4, 4.8, and 3.6 kilobasepairs DNA fragments in Mountrail. Panel B Autoradiogram of Ben and Mountrail Hind III-digested DNA hybridized with clone WG583. Polymorphism is shown by a 7.6 kilobasepairs DNA fragment present in Mountrail but absent in Ben.



Materials and Methods

Genomic DNA extraction, restriction endonuclease digestion, and Southern blotting were described in Riede and Anderson (1996). RFLP clones were obtained from Mark Sorrells at Cornell University (WG Clone) and A. Kleinhofs at Washington State University (ABG clone). Both clones were known to hybrized to low-copy DNA sequences. The procedure was repeated twice to confirm results.

Riede, C.R., and J.A. Anderson. 1996. Linkage of RFLP markers to an aluminium tolerance gene in wheat. Crop Sci. 36:905-909.

EXHIBIT C

U.S. DEPARTMENT OF AGRICULTURE AGRICULTURAL MARKETING SERVICE COMMODITIES SCIENTIFIC SUPPORT DIVISION BELTSVILLE, MARYLAND 20705

OBJECTIVE DESCRIPTION OF VARIETY

9900266

	RITICUM SPP.)
NAME OF APPLICANTIS	FOR OFFICIAL USE ONLY
NDSU Research Foundation	FYPO NUMBER
ADDRESS (Street and No. or R.F.D. No., City, State, and ZIP Code)	
Box 5014	VARIETY NAME OR TEMPORARY DESIGNATION
Fargo, ND 58105-5014	
•	Mountrail
Place the appropriate number that describes the varietal charace Place a zero in first box (e.s. 089 or 09) when numb	er of this variety in the boxes below.
1. KIND:	
2 1 = COMMON 2 = DURUM 3 = EMMER 4 = SPELT	5 = POLISH 6 = POULARO 7 = CLUB
2. TYPE,	
1 1 = SPRING 2 = WINTER 3 = OTHER (Specify)	1 = SOFT 3 = OTHER (Specity) 2 = HAROAmber
3 1 = WHITE 2 = RED 3 = OTHER (Specify) Amber	
3. SEASON - NUMBER OF DAYS FROM EMERGENCE TO:	
5 5 FIRST FLOWERING	5 9 LAST FLOWERING
4. MATURITY (SO% Flowering):	
0 0 NO. OF DAY'S EARLIER THAN	6 1 = ARTHUR 2 = SCOUT 3 = CHRIS
NO. OF DAYS LATER THAN	4 = LEMHI 5 = NUGAINES 6 = LEEDS
5. PLANT HEIGHT (From soil level to top of head):	
8. 5 CM. HIGH	
CM. TALLER THAN	
	3 = ARTHUR 2 = SCOUT 3 = CHRIS
0 5 CM. SHORTER THAN	6 TEARTHUR 223000
	4=LEMHI 5=NUGAINES 0-LEEDS
6 PLANT COLOR AT BOOTING (See reverse):	7. ANTHER COLOR:
2 I = YELLOW GREEN 2 = GREEN 3 = BLUE GREEN	1 1 = YELLOW 2 = PURPLE
s. STEM:	
Anthocyania: 1 = ABSENT 2 = PRESENT	1 Vary bloom: 1 = ABSENT 2 = PRESENT
Hairiness of last internode of tachis: 1 = ABSENT 2 = PRESENT	1 Internodes: 1 = HOLLOW 2 = SOLID
0 4 NO. OF NODES (Originating from node above ground)	2 0 CM INTERNODE LENGTH BETWEEN FLAG LEAF
AURICLES	
Anthocyania: 1 = ABSENT 2 = PRESENT	1 Hairiness: [= ABSENT 2 = PRESENT
D. LEAF:	
Fing leaf at = ERECT 2 = RECURVED booting stage: 3 = OTHER (Specify):	Flag leaf: 1 = NOT TWISTED 2 = TWISTED
Hairs of first leaf sheath: 1 = ABSENT 2 = PRESENT	1 Vary bloom of flag lenf obeath: 1 = ABSENT 2 = PRESENT
1 1 MM. LEAF WIDTH (First loof bolow flag loop)	2 5 CM. LEAF LENGTH (First leaf below flag leaf):

II. HEAD:			
Density: 1 = CA	x 2 mocess	4 Shape: 1 = TA:	PERING 2 STRAP 3 = CLAVATE
4 Awnedness: 1 =	AWHLESS 2 = APICALLY AWHLETED	3 = AWHLETED 4 = AM	MEO
1 Color at maturity:	T = WHITE Z = YELLOW 3 = PINK S = BROWN 6 = BLACK 7 = OT		
0 6 CM. LENGT		1 1 MM. WIOTH	
12. GLUMES AT MATU Bength: 1 = SHOP	RITY: RT (CA. 7 mm.) 2 = MEDIUN (CA. 8 mm.) G (CA. 9 mm.)	1 2 1	ROW (CA. J. mm.) 2 = MEDIUM (CA. J. 5 m
•		2 = WIDE	(CA. 4 mm.)
6 Shoulder 1 = WAN	ARE 5 = ELEVATED 6 = APICULAT	E 2 Всак; 1 = овти	SE 2 = ACUTE 3 = ACUMINATE
13. COLEOPTILE COLO	OR:	14. SEEDLING ANTHO	CYANIN:
<u> </u>	RED J = PURPLE	1 I = ABSENT _	
15. JUVEHILE PLANT O	ROWTH HABIT:		
3 1 = PROSTRATE	2 = SEMI-ERECT 3 = ER	ECT	
16. SEED:			
3 Shape: I = OVATE	2 = OVAL 3 = ELLIPTICAL	1 Cheek: 1 = ROUN	DED 2 = ANGULAR
Brush 1 = SHORY	. 2 = MEDIUN 3 = LONG	1 Brush: I = NOT	COLLARED 2 = COLLARED
Phenol reaction (See Instructions):	1=1VORY 2=FAWN 3=LT. BRO 4=BROWN 5=BLACK		
2 Color: I = WHITE	en de la composition de la composition La composition de la	5 = OTHER (Specify)	
0 7 MM. LENGTH	0 3 MM. WIDTH	3 8 GM. PER 1000	0 seene
17. SEED CREASE:			
	LESS OF KERNEL WINOKA	Don't to accom	
1 - 1	ESS OF KERNEL 'CHRIS'		R LESS OF KERNEL 'SCOUT' R LESS OF KERNEL 'CHRIS'
	AS WIDE AS KERHEL LEMHI		A LESS OF KERNEL "LEMH!"
	ted, 1 = Susceptible, 2 = Resistant)		
2 STEM RUST	2 LEAF RUST (Races)	O STRIPE RUST	0 LOOSE SMUT
0 POWDERY MILDEW	0 BUNT	OTHER (Specify)	
19. INSECT: (0 = Net Team	d, 1 = Susceptible, 2 = Recistant)		
0 SAWFLY	O APHIO (Bydv.)	OE CHEEN ENG	CEREAL LEAF BEETLE
OTHER (Specify)	HESSIAN FLY		
•	RACES		[U] s [0] c
	VS subs	0 339 0 E	0 = 0 =
20. INDICATE WHICH YARIE	TY MOST CLOSELY RESEMBLES THAT S	UBMITTED:	
T.MACTER.	NAME OF VARIETY	CHARACTER	NAME OF VARIETY
Plant tillering		Seed size	
Leaf size	,	Seed shape	
Leal carriage		Caleoptile elangation	
7.8		Seedling pigmentation	

INSTRUCTIONS

GENERAL: The following publications may be used as a reference aid for the standardization of terms and procedures for completing this form:

- (a) L.W. Briggle and L. P. Reitz. 1963. Classification of Triticum Species and Theat Varieties Grown in the United States. Technical Bulletin 1278. United States Department of Agriculture.
- (b) W.E. Valls, 1965. A Standardized Phenol Method for Testing Wheat Seeds for Varietal Purity, contribution No. 28 to the handbook of seed testing prepared by the Association of Official Seed Analysts. (See attachment.)

	Protein	tein	Protein			1 Protes (1994)	turough 199	.(9)
Genotype	Wht	Sem	,	. 6	Extra	Extraction	Kernel Size	Size
			MA	20	Tot.	Sem.	۲ % ۲	S %
Mountrail	14.2	13.6	5.4	4	69.0	60.1	55	2
Belzer	14.4	13.7	6.7	56	68 4	ת ה	Ç	
Ben	14.7	13.9	6.3	45	69 2		<u>ရ</u>	~
Munich	14.5	13.8	5.0	9 6	7.00	4.00	-	8
Renville	14.5	13.6	נ	3 -	4.60	90.0	46	ო
Manroe	14.3	 	o; 4	4 ,	6.69	6.09	39	4
V.) r	<u> </u>	4 ,	4-	69.4	60.2	9	7
· ·	4.	13.9	5.5	41	0.69	69.9	54	0
Medora	14.7	13.9	5.8	45	68.8	00 00 00	97	i c
Rugby	14.4	13.5	3.0	24	69.1	60.4	9 4 1	י מי
Lloyd	14.1	13.1	5.6	45	68.6	59.4	4 7	א ני
	1						ļ	ŧ

U.S. DEFAR IMENT OF AGRICULTURE AGRICULTURAL MARKETING SERVICE	The following statements are made in 1974 (5 U.S.C. 552a) and the Paperwo	accordidate from the Privacy Act of the Reduction Act (PPA) of 1995.
EXHIST: E STATEMENT OF THE BASIS OF OWNERSHIP	Application is required in order to di certificate is to se issued (7.8.S.C. 2 until certificate is issued (7.8.C. 242)	421). Information is peid confidentia
1. NAME OF APPLICANT(S)	2. TEMPORARY DESIGNATION	3. VARIETY NAME
NDSU Research Foundation	D901313	Mountrail
4. ADDRESS (Street and No., or R.F.D. No., City, State, and ZIP, and Country)	5. TELEPHONE (include area code)	6. FAX (include area code)
c/o Executive F oundatio n <i>Director</i> P. O. Box 5014	701-231-8931	701-231-1013
Fargo, ND 58105-5014	7. PVPO NUMBER	
8. Does the applicant own all rights to the variety? Mark an "X" in appropri	riate block. If no, please explain.	X YES TO NO
Is the applicant (individual or company) a U.S. national or U.S. based or	ompany?	X YES NO
If no, give name of country		
10. Is the applicant the original owner?	(O If no, please answer one of the	ollowing:
a. If original rights to variety were owned by individual(s), is (are) the or	iginal owner(s) a U.S. national(s)?	
X YES T	If no, give name of country	•
b. If original rights to variety were owned by a company(ies), is(are) the	original owner(s) a U.S. based compan	y?
X YES	If no, give name of country	v.
11. Additional explanation on ownership (if needed, use reverse for extra sp	pace):	
See additional Exhibit E Statement of The Ba	asis of the Applicant's (Dwnership
included in the application.		
		: :
PLEASE NOTE:		
Plant variety protection can be afforded only to owners (not licensees) who meet o	ne of the following criteria:	
 If the rights to the variety are owned by the original breeder, that person must be which affords similar protection to nationals of the U.S. for the same genus and 		per country, or national of a country
If the rights to the variety are owned by the company which employed the origin member country, or owned by nationals of a country which affords similar prote	nal breeder(s), the company must be U.S. be ection to nationals of the U.S. for the same	ased, owned by nationals of a UPOV genus and species.
3. If the applicant is an owner who is not the original owner, both the original own	ner and the applicant must meet one of the a	bove criteria.
The original breeder/owner may be the individual or company who directed final b	reeding. See Section 41(a)(2) of the Plant	Variety Protection Act for definition.
According to the Paperwork Reduction Act of 1995, no persons are required to respond to a collection is 0581-0055. The time required to compete this information collection is 0581-0055. The time required to compete this information collection and partitions and maintaining the data needed, and completing and	tion is estimated to average 10 matutes per respon	ordrol number. The valid OMB control number for se, including the time for reviewing instructions.

The U.S. Department of Agriculture (USDA) prohibits discrimination in its programs on the basis of race, color, national origin, sex, religion, age, disability, political beliefs, and marital or familial status. (Not all prohibited bases apply to all programs). Persons with disabilities who require alternative means for communication of program information (braille, large print, audiotape, etc.) should contact USDA's TARGET Center at 202-720-2600 (voice and TDD).

To file a complaint, write the Secretary of Agriculture, U.S. Department of Agriculture, Washington, D.C. 20250, or call 1-800-245-6340 (voice) or (202) 720-1127 (TDD). USDA is an equal employment opportunity employer.

EXHIBIT E - STATEMENT OF THE BASIS OF THE APPLICANT'S OWNERSHIP

Dr. Elias M. Elias, an employee of the North Dakota Agricultural Experiment Station and North Dakota State University, is a plant breeder who developed 'Mountrail' the durum wheat cultivar for which Plant Variety Protection is hereby sought. The employee by agreement and because of the condition of the use of facilities and funds of the North Dakota Agricultural Experiment Station and North Dakota State University has assigned all ownership rights to 'Mountrail' durum wheat to the North Dakota Agricultural Experiment Station and North Dakota State University.

North Dakota State University on behalf of the North Dakota Agricultural Experiment Station has assigned all ownership to the NDSU Research Foundation. The NDSU Research Foundation is a nonprofit corporation set up to own and manage the intellectual property of North Dakota State University.